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Characterization of ethylene norbornene copolymer aged: Impact of norbornene content on the stability thermal and oxidative

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This study is an overall theme on the study of material ageing induced by ionizing radiation, photodegradation and the heat, that mimicking sterilization and storage ageing of medical devices. It is therefore, performed on different grade of ethylene and norbornene (ENC). These copolymers have interesting physicochemical properties for pharmaceutical and medical applications, due to their transparency similar to glass, good chemical resistance and low permeability to gas and water. The results presented here put in evidenced the modifications of the physico-chemical properties of aged ENCs, using experimental techniques such as FTIR (Fourier Transformed Infrared spectroscopy), UV spectroscopy, DSC (Differential Scanning Calorimetry), TGA (Thermogravimetry Analysis) . ENC stability is influenced by several parameters including the rate of norbornene present in the structure. Nevertheless, the effect of treatment (ionizing radiation, heat or photodegradation) used as a sterilization process, and also the treatment by photodegradation, used as a storage process, has a real impact on the oxidation induction time to oxidation of ENCs. It is also highlighted in this study, the presence of oxidations compounds that can act as oxidation protector. It would be interesting now to identify them to determine their specific toxicity.

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